

What is claimed is:

1. An ambient, 100% reactive liquid structural adhesive composition comprising:

in part A:

- (a) about 10-90% by weight of at least one free radical-polymerizable monomer;
- (b) about 0-20% by weight of an adhesion promoter;
- (c) a toughener, optionally an auxiliary toughener;
- (d) a reducing agent; and

in part B: from 3 – 6 wt. % of an epoxy resin, wherein the weight percents are based on the total weight.

2. An adhesive composition according to claim 1 wherein the primary toughener comprises an olefinic-terminated liquid elastomer produced from a hydroxyl-terminated polyalkadiene.

3. An adhesive composition according to claim 1 wherein the auxiliary toughener is present and comprises an A-B-A block copolymer wherein the A block is selected from styrene, ring alkylated styrene or a mixture thereof and the B block is an elastomeric segment.

4. An adhesive composition according to claim 3 wherein the auxiliary toughener is present in an amount of about 1 to 10 weight percent.

5. An adhesive composition according to claim 3 wherein the primary toughener comprises an olefinic-terminated liquid elastomer produced from a hydroxyl-terminated polyalkadiene, and containing a secondary OH group.

6. An adhesive according to claim 1 wherein the reducing agent is selected from N,N-diisopropanol-p-chloroaniline; N,N-diisopropanol-p-bromoaniline; N,N-diisopropanol-p-bromo-m-methylaniline; N,N-dimethyl-p-chloroaniline; N,N-dimethyl-p-bromoaniline; N,N-diethyl-p-chloroaniline; and N,N-diethyl-p-bromoaniline.

7. An adhesive according to claim 5 wherein the primary toughener comprises an olefinic-terminated liquid elastomer produced from a hydroxyl-terminated polyalkadiene and the auxiliary toughener comprises an A-B-A block copolymer wherein the A block is selected from styrene, ring alkylated styrene or a mixture thereof and the B block is an elastomeric segment derived from a conjugated diene or olefin.
8. A two-part acrylic structural adhesive exhibiting improved T-peel strength on galvanized steel and cures at ambient conditions, comprising:
in a first package from about 10 to about 90 percent by weight of at least one ethylenic unsaturated methacrylic ester selected from the group
1) C₃-C₁₀ alkyl monosubstituted-, C₁-C₆ alkyl disubstituted-, C₁-C₄ alkyl tri-substituted, and C₁-C₄ alkyl tetra-substituted cyclohexyl methacrylate, wherein the substituents are in either the 3, 4, and/or 5 ring position and group
2) linear or branched C₄-C₁₀ branched alkyl methacrylates; and
from about 10 to about 80 percent by weight of a toughener,
an adhesion promotor; and in a second package, a bonding activator.
9. The adhesive of claim 8 wherein said second package further comprises from about 3 to about 6% by wt. of an epoxy resin.
10. The adhesive of claim 8 wherein said ethylenic unsaturated methacrylic ester is selected from the group consisting of 3,3,5-trimethylcyclohexyl methacrylate, 4-tert-butylcyclohexyl methacrylate, 3,3,5,5-tetramethylcyclohexyl methacrylate, 3,4,5-trimethylcyclohexyl methacrylate, bornyl (C₁₀ H₁₇) methacrylate, isobornyl methacrylate, and (isopropyl methyl) methacrylate.
11. A two-part structural adhesive, that is capable of curing at ambient conditions and comprises:
in an A-side
(a) 10-90, preferably 20-70, weight percent of an olefinic monomer selected from the group consisting of (meth)acrylic acid; esters, amides or nitriles of (meth)acrylic acid; maleate esters; fumarate esters; vinyl esters; conjugated dienes; itaconic acid; styrenic compounds; and vinylidene halides;

- (b) 10-80 weight percent of the primary toughener;
- (c) 0-15 weight percent of the auxiliary toughener;
- (d) 0-20, preferably 2-10, weight percent of a phosphorus adhesion promotor containing one or more olefinic groups,
- (e) 0.05-10, preferably 0.1-6, weight percent of at least one reducing agent which is interactive with an oxidizing agent to produce free radicals which are capable of initiating and propagating free radical polymerization reactions; and

in a B-Side a bonding activator containing an oxidizing agent of a ambient temperature-active redox couple catalyst system, and from about 3% to about 6% by wt. on total weight of A and B sides, of an epoxy resin.